Industrial Standardization

and Commercial Standards Monthly

(*See Article on Page 77*)

April 1939

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RUTH E. MASON, *Editor*

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Our Front Cover: **Worker wearing guard to protect his eyes and head while repairing a drag line bucket at Universal City, California. Photo, courtesy Lincoln Electric Company, Cleveland, Ohio.**

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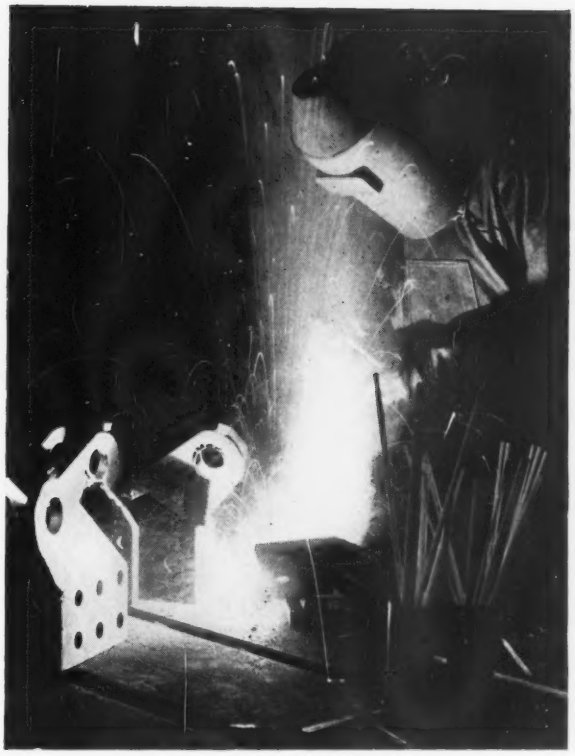
New rules in present edition provide for protection of lungs from fumes, dusts, and gases, as well as protection of heads and eyes

American Standards Association approved revision in December, 1938



Courtesy Lincoln Electric Co.

Revised Code to Protect Heads, Eyes, and Lungs

by

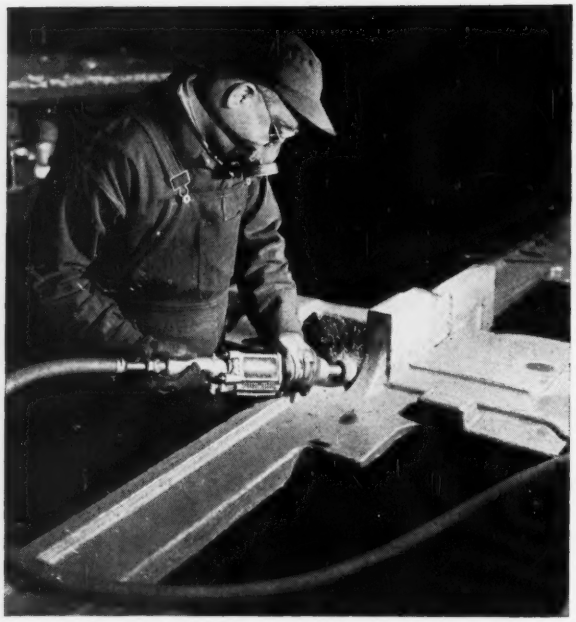
M. G. Lloyd[1]

Chairman and Secretary, Sectional Committee on Protection of Heads, Eyes, and Respiratory Organs (Z22)

IT has been estimated[2] that one per cent of the industrial workers in the United States are exposed to a serious hazard of silicosis, that insidious lung disease which attacks those who chronically inhale silica dust. Many of these workers have been incapacitated for work in the past for this cause, and about 110,000 are estimated to be in some measure affected at the present time. Obviously there is a great opportunity here for prevention of human suffering and death. And silica is only one of the dusts that may produce similar results.

It is a general principle in accident-prevention work that removal of a hazard is preferable to protection against the hazard. This applies, of course, to dust hazards. Where creation of dust can be prevented, where dust can be confined so as not to contaminate the atmosphere, where it can be exhausted so as not to enter the breathing zone, these procedures are of course to be preferred. But in industrial operations where it is

[1]National Bureau of Standards, Washington, D. C.
[2]Report of National Silicosis Conference, U. S. Department of Labor, 1937.



Courtesy Norton Company

Respirators and goggles combined protect the worker from dust and flying particles thrown off by his abrasive tools

not practicable to suppress the dust or keep it out of the breathing zone, measures must be adopted to protect the worker from inhalation of the dust. This protection usually takes the form of personal protective equipment.

Recognizing the need for standards for the construction and application of such equipment the American Standards Association many years ago, upon recommendation of the Safety Code Correlating Committee, enlarged the scope of its project Z2 to include protection of the lungs against inhalation of dusts, vapors, fumes, etc. This project under the title "National Safety Code for the Protection of the Heads and Eyes of Industrial Workers" had previously covered only head and eye protection.

In preparing the new edition, approved by the American Standards Association as an American Standard on December 28, 1938, the additional field was covered and the Code now bears the title "American Standard Safety Code for the Protection of Heads, Eyes, and Respiratory Organs."

This Code was developed by a sectional committee of 40 members functioning under the sponsorship of the National Bureau of Standards. It has been published by the Bureau as Handbook H24.

Some criticism has been expressed because this entire field, covering items in some ways unrelated, has been handled as a single project, in a single document, and as an activity of a single sectional committee. On the other hand, it has the common element of covering devices worn on the individual's head, and sometimes the combination of two or more protective functions in a single device such as the protectors used for abrasive cleaning, and some types of electric welding work. The advantages of having all the requirements for one piece of equipment in a single document are obvious.

The completion of the standards for lung protection was held back until the Bureau of Mines had explored the possibilities of highly efficient filtering devices, and the results of this work have been incorporated in the American Standard. As a result, the listing of the various types of respirators by the U. S. Bureau of Mines as "permissible" is sufficient evidence that they comply with these standards for particular applications. The details of the test procedures of the Bureau of Mines are referred to in the Code in several places.

Small amounts of dusts and vapors may be breathed without deleterious effects, the amounts depending on the chemical composition, form, and particle size of the material, individual characteristics of the worker, conditions of exposure, etc. The Code does not attempt to set up the limits of tolerance by human beings for the breathing of various types of dust. Many tests of animals are available, but opinions by experts have not yet crystallized on definite concentrations which can be considered critical limits except in the case of a very few substances. The American Standards Association has organized a committee to investigate and render decisions on this subject. And its pronouncements will be a valuable aid in determining when the wearing of respirators, gas masks, and similar devices is called for. The Code does recommend, however, that no worker be continuously subjected without a protector to an atmosphere containing any form of mineral dust in a quantity exceeding fifty million particles per cubic foot, or 0.0044 grains per cubic foot, of a size less than 10 microns.

Types of Protection

The Code recognizes twelve types of operations or processes for which protection to the head, eyes, or lungs is needed, and designates these by letters of the alphabet. It specifies the type of protection needed for each type of operation and the tests which must be met by the device to insure its suitability. These types are summarized in the accompanying table.

One section of the Code is devoted to operating rules. These deal with such matters as steriliza-

tion, so essential when equipment is worn by more than one person; the proper fitting of devices to the individual to insure comfort and real protection; inspection and testing of devices; and replacement of broken and exhausted parts.

Use by Industry

The Code offers a recognized standard for adoption by regulatory authorities in those states where mandatory rules are deemed desirable. The greatest use of the Code will no doubt be found to be by manufacturers and users of protective equipment. By meeting Code requirements the manufacturer may be confident that his product will meet the needs of industry.

It is the user of protective equipment, however, who usually approaches the problem with less specialized knowledge of conditions and who is consequently in need of such guidance as can be found in the Code. His first problem is to decide whether protective equipment is needed. If the operation in question is one which typically calls for protective equipment, the Code will make this clear. In other cases such as those where a questionable amount of hazardous dust is being generated, the services of an expert may be needed to make dust counts and decide whether the conditions are tolerable as they are.

After the need for protective devices has been settled, the Code will give the necessary guidance as to the type of devices which should be obtained, and then purchases should be restricted to firms which guarantee their products to comply with Code requirements. If further proof of such compliance is desired, or in any purchases involving large quantities, representative samples of the equipment delivered may be tested by the purchaser if he has the necessary testing facilities, or by a qualified testing laboratory if those facilities are not at hand. Some of the tests specified in the Code can be carried out with very simple equipment, such as the drop test for strength of goggle lenses. Other tests call for special equipment and trained personnel, such as those for the ultra-violet transmission of welders' glasses, and those for the filtering efficiency of respirators. In the latter field the testing problem has been largely solved by the U. S. Bureau of Mines, which on application will furnish a list of devices which have been found to meet their own specifications for the several classes of equipment—a sufficient evidence that they meet the standard requirements.

Courtesy National Safety Council

Goggles save the eyes from the white-hot blaze of a steel furnace but in this work lungs are not threatened

How Hazards Are Classified

Key Letter	*Part to be Protected*	*Hazard Involved*	*Protective Devices*
A	Eyes.	Relatively large flying objects.	Goggles, face mask, or helmet.
B	Eyes.	Dust and small flying particles.	Goggles.
C	Eyes.	Dust and wind.	Goggles.
D	Eyes.	Splashing metal	Face mask or goggles.
E	Eyes.	Gases, fumes, and liquids.	Goggles, face masks, or hoods.
F	Eyes.	Reflected light or glare.	Goggles.
G	Eyes.	Injurious radiant energy (moderate).	Goggles, face mask, helmet, or shield.
H	Eyes and head.	Injurious radiant energy (intense).	Helmet or shield.
I	Respiratory organs.	Dust, smoke, mists, or fumes.	Respirator, hose mask, oxygen breathing apparatus, or gas mask with mechanical filter.
J	Eyes, head, and respiratory organs.	Excessive amounts of dust and small flying particles.	Hood or helmet, with fresh-air supply.
K	Respiratory organs.	Noxious gases or vapors.	Gas mask, hose mask, respirator, or oxygen breathing apparatus.
L	Head.	Falling objects.	Hat or cap.

Nearly all of the eye accidents reported are of a mechanical nature, and the number indicates that existing hazards to the eye are frequently not realized by shop managers. A national survey made by the National Society for the Prevention of Blindness a decade ago showed that about 200,000 eye accidents were occurring in industry each year, and that except for fatal accidents they surpassed all others in seriousness and expense. That survey indicated also that in plants supplying goggles to their workers, thousands of employees had had their eyes saved by wearing goggles. One employee out of each 156 in the plants covered by this statement had an eye saved each year. All too frequently the hazards to the eye in a shop go without attention until an accident occurs. The loss of an eye is too big a penalty to pay for neglect of this kind. It behooves every superintendent of an industrial plant to examine the conditions in his own shops and see whether hazards to the eyes of his workers have been correctly appraised and whether appropriate protection is being furnished.

NRDGA Platform Shows Standards As 1939 Goal

At the Annual Meeting of the National Retail Dry Goods Association January 16-20, Saul Cohn, City Stores Company, New York, re-elected president, called for sound development of standards as one of the important planks in the Association's platform for 1939. Such standards are needed, he said, in order that stores and customers may speak the same language. He outlined other important sections of the platform as use of informative labeling so that the public will know what it is buying; and elimination of false and exaggerated claims from advertising.

The National Retail Dry Goods Association is one of the members represented on the Advisory Committee on Ultimate Consumer Goods. This committee is working on recommendations in connection with the development of standards for consumer goods for consideration by the Standards Council of the American Standards Association.

New Committee to Coordinate Information on Corrosion

The American Coordinating Committee on Corrosion, which is to serve as a clearing house and coordinating agency for information on corrosion and corrosion prevention, has been formed by technical societies and other organizations engaged in the study of corrosion. The committee was organized February 17 at the headquarters of the American Society for Testing Materials at Philadelphia.

As its first step the committee is compiling a list of the names and addresses of those working in the field of corrosion in this country, together with information as to their special interests and their current programs of corrosion studies. The committee is using the facilities of the various cooperating societies, supplemented by the extensive knowledge of its members, concerning corrosion studies now in progress throughout industry. Information is being sought respecting the names of individuals and organizations engaged in corrosion studies, the nature of such studies, and a record of experience and publications.

The next meeting of the committee will be held in June at Atlantic City during the annual meeting of the American Society for Testing Materials. At this meeting the information compiled will be reviewed, a permanent organization set up and the work to be done by the committee further considered. Until the permanent organization is completed, C. L. Warwick, secretary-treasurer of the American Society for Testing Materials, is serving as temporary chairman of the committee.

British Book Is Authority On Quality Control

Recent renewal of interest in scientific quality control in manufacture and inspection of products was shown during the past two weeks with the sale of 25 copies of the British report, *The Application of Statistical Methods to Industrial Standardization and Quality Control*, by E. S. Pearson, the ASA Library announces. The book, which was first reviewed in INDUSTRIAL STANDARDIZATION, February, 1936, shows how engineers can use statistical methods in analyzing causes of defects in manufactured products to maintain control of quality. It also explains methods of compiling statistics and control charts for analyzing results.

A limited number of copies can still be ordered from the British Standards Institution through the ASA office at $1.85 each.

Eye Accidents Costly, State Reports Show

The need for definite requirements to protect the eyes of industrial workers is well illustrated by the statistics of accidents and compensation in those states where full accident reports are regularly made. In Wisconsin in four years prior to the depression there were 2,767 cases of industrial eye injuries, of which 147 involved both eyes of the worker. Two cases resulted in death, four in permanent total blindness, and 579 in permanent partial disability. Total compensation awarded was $1,266,450, in addition to which medical fees aggregated $182,943. In Pennsylvania in three years there were 1,771 eyes lost, and the Department of Labor and Industry stated in 1923:

"In the ten years' experience of this Department in accident prevention, there is not a single example of loss of sight from flying particles of material when goggles were worn, even if the goggles were broken when struck by flying particles."

In New York State in one year 349 workers lost the sight of one eye and 363 suffered a permanent partial injury. One million three hundred thousand dollars was awarded in compensation in that year.

A survey carried out in 1926 and 1927 by the National Society for the Prevention of Blindness and the National Safety Council indicates the great saving of eyes due to the wearing of goggles. In 583 industrial plants, it was reported that a total of 7,411 employees had their eyes saved by wearing goggles, out of a total of 578,000 employees. This represents an eye for each 156 employees each year. The industries covered included metal working, mining, foundries, chemicals, quarrying, etc. This report also shows that approximately 200,000 eye accidents occur in industry annually and that, except for fatal accidents, they surpass all other kinds in seriousness and expense.

—From "Discussion of the Rules," Safety Code for the Protection of Heads, Eyes, and Respiratory Organs. (Z2-1938).

How Preferred Numbers are now being used in the Electrical Field

Practical Applications of Preferred Numbers

by
D. F. Miner
George Westinghouse Professor of Engineering
Carnegie Institute of Technology[1]

THE recognized logic and advantage of preferred numbers applied to engineering design are theoretically clearly acceptable. It is also clear that when new lines of products are being proposed the adoption of such a system in selection of sizes, ratings, or major dimensions can be undertaken with minimum difficulty. However, the transition to preferred numbers in the cases of established lines requires more careful study and usually involves the upsetting of well established practices. In spite of this, it is gratifying that continual progress is being made in using preferred numbers where the advantages can be demonstrated. Gradual progress is most desirable and most likely to endure.

It may be useful in urging the further use of preferred numbers to describe definite examples of applications already made in electrical manufacturing. Among purchased goods, standard hardware (bolts, screws, nuts, pins, and rivets) offers a very favorable opportunity for preferred numbers.

Figure 1 demonstrates the flexibility permissible in combining series (5, 10, 20) in one list of material. Adherence to one series is not essential. It should be emphasized that the series of preferred numbers are numbers from which a selection is to be made as needed, not a rigid system which requires the use of all steps.

Preferred numbers are, of course, very convenient to the purchaser of materials. Selection of fabricated metal sizes, such as cold rolled bar stock, from fractional preferred number series is often a key to standardization of other raw materials.

Restrictions are frequently presented, however,

[1]Professor Miner is also Consulting Engineer for the Westinghouse Electric & Manufacturing Co.

FIG. 1

Bolts—Hexagon Head—Steel, Not Heat Treated

DIAMETER 10-series (one exception)	LENGTH 20-series (few exceptions)
1/4	1
5/16	1-1/4
3/8	1-1/2
1/2	
5/8	1-3/4
3/4	2
1	2-1/4
1-1/4	
1-1/2	2-1/2
1-3/4	2-3/4
2	3
2-1/2	
3	3-1/4
3-1/2	3-1/2
4	3-3/4
	4
	4-1/2
	5
	5-1/2
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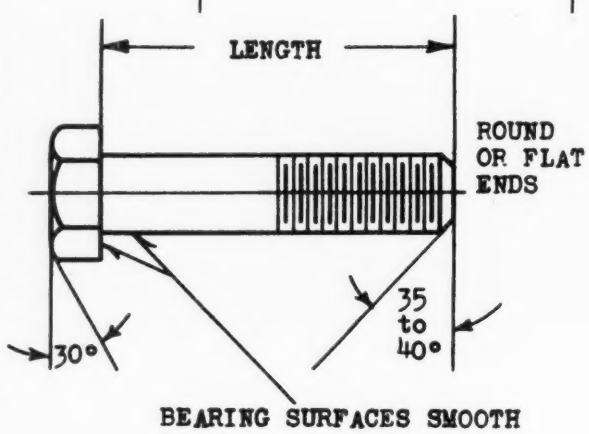


in the case of raw materials by the existence of widely used size and gage systems which do not conform to any preferred number series. An example of this is the multiplicity of wire gages in use: Brown and Sharpe, or American, Birmingham, National, United States, Stubbs, Music, Twist Drill, etc. It can be shown that the deviation of any of these from preferred numbers is slight. Adoption of one system, based on preferred numbers, would be a desirable standardization if the inertia of existing practice could be overcome[2].

In the design of apparatus, however, freedom of choice is more often allowed. This is especially true of new lines of apparatus, where development is not prejudiced by haphazard growth. For example: Ratings of Thyratrons were adopted on a preferred number basis when the art was new. A sad example of a case where this was not done but where it could have been done is the rating of sizes of electric refrigerators.

Preferred numbers have already become well established in certain fields. For example, Messrs Hellmund and Hommel[3] list the following:

(*a*) Dimensions:
- (1) Bores and outside diameters of motor armatures, and outside diameters of stator punchings.
- (2) Inside and outside diameters of punched circular washers.
- (3) Perimeter and height of transformer tanks.
- (4) Sizes of round, cold-rolled steel stock.
- (5) Sizes of broached holes, square or round, and corresponding drilled holes.
- (6) Key width and depth.
- (7) Commutator diameters.
- (8) Carbon brushes (width, thickness, and length).
- (9) Mounting dimensions of electric motors, such as distance between holding-down bolts and height of center from base.

(*b*) Cross-sectional areas and exponential factors:
- (1) The 10-series was used for the cube of the diameter of railway motor shafts. This means that the strength of shafts for a certain line of motors progresses in 25 per cent steps, and correspondingly the transmitting power of the shafts.
- (2) The B & S wire gage system closely approaches in the areas of wires the 10-series of preferred numbers. This system was developed long before preferred numbers were standardized.

(*c*) Contents of oil tanks and similar reservoirs.

(*d*) Mechanical ratings:

Horsepower-seconds (kinetic energy) for flywheels are standardized on the 20-series of the decimal preferred numbers.

(*e*) Electric ratings:

Ampere ratings of grid glow tubes are based on the 5-series.

(*f*) The National Electrical Manufacturers Association established .8 and 1.0 as standard power factors for alternator and transformer ratings; these are parts of the 10-series. On this account, it will be easy to have preferred numbers ratings in kw and kva (See *Mechanical Engineering*, April, 1931, page 288.)

(*g*) Classification of sizes:
- (1) Ranges of shaft diameters for which keys of fixed proportions are used.
- (2) Ranges of shaft diameters for which fixed machining allowances and tolerances are used, including bores of mating parts.

The selection of suitable dimensions or properties involves a consideration of the limitations of the problems involved. How close intervals and between what extreme limits are figures desired? Is the line complete or are gaps to be left for later addition? The details of the following subjects are given to show how specific applications can be worked out.

(1) *Flywheels*

The kinetic energy of flywheels for different speeds and diameters has been specified using the 20-series. Some numbers are not exact preferred numbers (*e.g.* 110,000 instead of 112,000) but rather general conformity is observed.

Rev per Minute	*Hp Seconds*	*Rev per Minute*	*Hp Seconds*
360	100,000		35,000
	110,000		40,000
	125,000		45,000
	140,000		50,000
	160,000		55,000
	180,000		60,000
	200,000		70,000
			80,000
514	60,000		90,000
	70,000		100,000
	80,000		110,000
	90,000		125,000
	100,000		140,000
	110,000		160,000
	125,000		180,000
	140,000		200,000
	160,000		220,000
	180,000		
	200,000	900	20,000
	220,000		22,000
	250,000		25,000
			28,000
600	80,000		30,000
	90,000		35,000
	100,000		40,000
	110,000		45,000
	125,000		50,000
	140,000		55,000
	160,000		60,000
	180,000		70,000
	200,000		80,000
	220,000		90,000
			100,000
720	30,000		

[2]Further information on this subject is given in *Product Engineering*, October, 1936, in a paper "Gages Based on Preferred Numbers" by J. I. Hommel.

[3]"Standardization by Preferred Numbers," *American Machinist*, Nov 5, 1931.

(2) *Key Widths and Depths*

Widths and depths of standard parallel keys for shafting are based on fractional preferred numbers (10-series for width and 20-series for depth). Not all numbers are present, only those in active use being listed. (See Figure 2.)

(3) *Thyratron*

The current ratings of thyratrons (grid glow tubes) follow the decimal 5-series.

.10 amperes
.63
2.5
4.0
10.0
25.0

(4) *Diameters of Motor and Generator Parts*

Dimensions such as stator diameter, rotor diameter, and rotor bore (for shaft or spider) have become established over a period of years and consequently contain figures which are not preferred numbers but the present designs conform remarkably well to the 40-series of fractional numbers. If the rotor diameter is a preferred number, the stator bore cannot be, since the air gap is small, especially in induction motors.

CS Motors (Squirrel-Cage, General Purpose)

Outside Diameter of Rotor	*40-Series*	*Inside Diameter of Rotor*	*40-Series*
4¾	4.75	1.24	1.25
5¼	5.3		
5½	5.6	1.48	1.50
5⅞	6.0	1.75	1.7
5.6	5.6	2	2
6.2	6.3		
6.23	6.3		
7.14	7.1	2.38	2.36
8.2	8.0	2.62	2.65
9.2	9.5		
9.9	10.0	2.62	2.65
11.0	11.2	3.25	3.35
12.4	12.5		
13.5	13.5		
14.2	14.0		
16.5	16.0		
17.5	18.0		
20	20		
21.5	21.2		

Direct-Current Motors (Type QS and QH)

Outside Diameter	*20-Series*	*Inside Diameter*	*40-Series*	*Core Length*	*20-Series*
22.5	22.4				
		9.5	9.5	11.5	11.2
		10.5	10.6	14	14
		12.5	12.5	5.5-7-10	5.6-7.1-10
25	25	11.5	11.2	13-18	14-16-18
		14	14	6-8-9.5-11	5.6-6.3-7.1-8-9-10
28	28	16	16	10-11.5-13-14.5	10-11.2-12.5-14
	31.5				
32	35.5	18	18	11.5-14-16.5	11.2-12.5-14-16
36		20	20	16-19	16-18-20
38		24	23.6	11-14-16.5	11.2-14-16
	40	26	26.5		
45	45	26.5	26.5	11-13-15-18.5	11.2-12.5-16-18
	50	28.5	28		
56	56	37.5	37.5	11-14-16-18	11.2-14-16-18
	63	39.5	40		
66		44.375	45	13.5-16-18.5	14-16-18
	71	48.75	47.5		
78		58.8	60	15-18-21	16-18-20
	80				
90	90	70.4	71	13.5-17-19.5-24	14-18-20-25
100	100	79.6	80	12.5	12.5
	112				
120					
	125				
	140				
144					
	160				
180	180				

Induction Motors

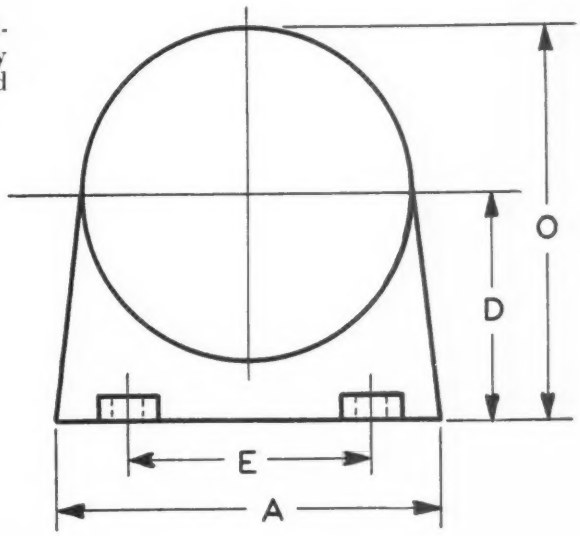
Stator Inside Diameter	*Preferred Numbers 40-Series*	*Rotor Inside Diameter*	*40-Series*
22	22.4	13.125	13.2
$25\frac{1}{2}$	25	17.5	17
		20	20
27	26.5	17	17
28	28	24	25
29	28	21	21.2
30	30	23	23.6
31.5	31.5	22	22.4
32.5	31.5	27.5	28
33.5	33.5	26	26.5
36.75	37.5	32	31.5

Synchronous Motors and Generators

Stator Inside Diameter	*Preferred Number 40-Series*
30.8	30
42.5	42.5
57.375	56
76	75
101.5	100
117.5	118
133	132

(5) *Mounting Dimensions of Electric Motors*

The standards adopted by National Electrical Manufacturers Association follow very closely the 20-series (both fractional and decimal) as shown in table below.



Type CS Motors

A= *Width of Base*			E= *Bolt Distance*			O= *Height of Motor*			D= *Height of Center*		
Motor	20-Series Fractional	20-Series Decimal	Motor	20-Series Fractional	20-Series Decimal	Motor	20-Series Fractional	20-Series Decimal	Motor	20-Series Fractional	20-Series Decimal
$9\frac{5}{8}$	10	10	8	8	8	$9\frac{7}{8}$	10	10	5	5	5
$10\frac{3}{4}$	11	11.2	9	9	9	11	11	11	$5\frac{1}{2}$	$5\frac{1}{2}$	5.5
$12\frac{1}{2}$	12	12.5	10	10	10	$12\frac{1}{2}$	12	12.5	$6\frac{1}{4}$	6	6.3
14	14	14	11	11	11	14	14	14	7	7	7.1
16	16	16	$12\frac{1}{2}$	12	12.5	16	16	16	8	8	8
18	18	18	14	14	14	18	18	18	9	9	9
20	20	20	16	16	16	20	20	20	10	10	10
22	22	22.4	18	18	18	22	22	22.4	11	11	11
25	24	25	20	20	20	$25\frac{1}{8}$	24	25	$12\frac{1}{2}$	12	12.5
31	32	31.5	$25\frac{1}{2}$	24	25	$29\frac{5}{8}$	32	31.5	$15\frac{1}{4}$	16	16
$36\frac{1}{2}$	36	35.5	$30\frac{3}{4}$	32	31.5	$34\frac{5}{8}$	36	35.5	$17\frac{3}{4}$	18	18

If the fractional series according to the American Standard (Z17.1-1936) had been available at the time the NEMA dimensions were set up, the American Standard would probably have been followed completely.

(6) *Commutators*

Although old designs have prevented strict adherence to preferred numbers, the present instructions for selection of gage diameters of commutators call for dimensioning in the 20-series (fractional).

(7) *Gear Ratios*

For gear motors the standard gear ratios listed are:

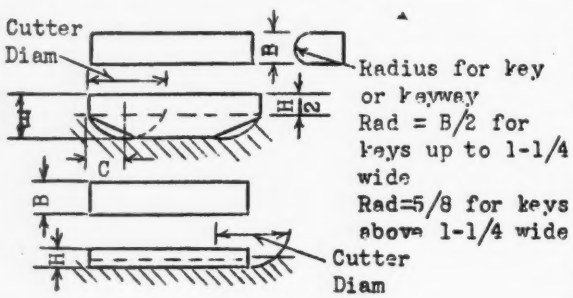
1.12	2.8	7.2	18.0	45	112
1.25	3.2	8.0	20.0	50	125
1.4	3.6	9.0	22.5	56	140
1.6	4.0	10.0	25.0	64	160
1.8	4.5	11.2	28.0	72	180
2.0	5.0	12.5	32.0	80	200
2.25	5.6	14.0	36.0	90	
2.5	6.4	16.0	40.0	100	

These, it will be seen, follow the decimal 20-series.

These examples show that a serious attempt has been made in several cases to establish dimensions adhering to preferred numbers, even though other practices were firmly established before preferred numbers came to be accepted.

FIG. 2

Plain Parallel Keys



Standard Key

B	H	C
1/8	1/8	19/64
3/16	3/16	3/8
1/4	1/4	27/64
3/8	3/8	23/32
1/2	1/2	13/16
5/8	5/8	1-1/16
3/4	3/4	1-11/64
1	3/4	1-11/64
1-1/4	7/8	1-1/4
1-1/2	1	
2	1-1/4	
2-1/2	1-3/4	
3	2	
4	2-3/4	
5	3-1/2	

Bibliography on Preferred Numbers

(1) American Standard for Preferred Numbers (Z17.1-1936)
(2) "Size Standardization by Preferred Numbers"—C. F. Hirshfeld and C. H. Berry (*Mechanical Engineering*, Dec 1922)
(3) "Experience and Suggestions Relating to the 'Preferred Number' System" (*Mechanical Engineering*, April 1931)
(4) "Standardization by Preferred Numbers"—R. E. Hellmund and J. I. Hommel (*American Machinist*, Nov 5, 1931)
(5) "Fundamentals of Standardizing Sizes and Ratings as Related to Preferred Numbers"—R. E. Hellmund (*Product Engineering*, Sept and Oct, 1932)
(6) "Standardizing Sizes and Ratings by Means of Preferred Numbers" (*Commercial Standards Monthly*, May 1932)
(7) "Standardization and Profits Aided by Preferred Numbers" (*Electrical World*, August 18, 1934)
(8) "Gages Based on Preferred Numbers"—J. I. Hommel (*Product Engineering*, October, 1936)
(9) "Preferred Numbers would Simplify Wire, Sheet Metal Gage Systems"—J. I. Hommel (INDUSTRIAL STANDARDIZATION, March 1936)

New Zealand Annual Report Shows Standards Activities

A number of copies of the 1938 Annual Report of the New Zealand Standards Institute are now available at the offices of the American Standards Association. The report covers the period from March 31, 1937, through March 31, 1938, and shows a total of 159 standards issued by that date.

"Close contact is maintained," the report says, "with the British Standards Institution, the Standards Association of Australia, the Canadian Engineering Standards Association, the South African Standards Institution, and their many contributions, that have assisted the development of standards activity in this Dominion, are gratefully acknowledged.

"Acknowledgments and thanks are also due to the American Standards Association, the American Society for Testing Materials, the National Bureau of Standards, and the United States Department of Commerce for their generous assistance and for the valuable publications and documents they have supplied."

Gaillard Speaks on Standards Before Industrial Engineers

"The Modern Approach to Company Standardization" was the subject of an address given by Dr. John Gaillard, mechanical engineer of the American Standards Association, before the Society of Industrial Engineers, April 4.

New Foreign Standards Available from ASA

New and revised standards recently received by the American Standards Association from national standardizing organizations in other countries include many subjects of interest to American industry. They are published in the language of the country from which they were received.

When ordering a standard, please refer to it by number as well as by title.

Denmark

Water-analysis, bacteriological examination (DS-265)

Italy

Tests on metallic materials (551 to 565)
Fittings for extra light pipes (566 to 602)
Ball and roller bearings (603 to 659)
Rods for aircraft (660-661)
Control cable pulleys for aircraft (662)

Japan

Steel bars (25)
Steel sections (26)
Bases and sockets for electric lamps (184)
Round hard-drawn copper trolley wire (185)
Grooved hard-drawn copper trolley wire (186)
High-voltage branch insulators (187)
Deviations and tolerances for metric screw threads No. 1 (192)
Deviations and tolerances for Whitworth screw No. 1 (193)
Deviations in pitch and angle of metric screw threads No. 1 (194)
Deviations in pitch and angle of Whitworth screw threads No. 1 (195)
Hexagon bolts (metric fine threads) (196)
Hexagon nuts (metric fine threads) (197)
Castle nuts (metric fine threads) (198)
Cow castel nuts (metric fine threads) (199)
Taper pines (200)
Receiving vacuum tube bases (204)
Hard-drawn copper strand wire for transmission line (205)
High-voltage feeder insulators (206)
Conduit tubes (steel) (207)
Couplers for conduit tubes (208)
Dimensions for distributor mountings for automobiles (209)
Hold-down arms of distributor mountings for automobiles (210)
Directions of rotation of electrical equipment for auto (211)
Diameters of engine cylinders for automobiles (212)
Flanges for flywheel housings for automobiles (213)
Flanges for clutch housings for automobiles (214)
Positions of control pedals for automobiles (215)
Positions of gear shift levers for automobiles (216)
Sections of brake linings for automobiles (217)
Sections of steel for laminated springs for automobiles (218)
Fork joints for automobiles (219)
Jack stay brackets (220)
Nickel steel (223)
Nickel chrome steel (224)
Lead (225)
Methods of chemical analysis and test of coal (236)

Holland

Technical drawings. Dimension-lines. Superscription (N 24)
Indication of rivets and bolts on drawings of steel constructions (N51)
Symbols for screw thread and screw bolts (N73)
Whitworth screw thread from 1/4 in. up to and including 6 in. diameter (N83)
Technical drawings. Symbols for elements of buildings (N114)
Cable accessories. Mounting of junction boxes, Maximum 10,000 volts (N160)
Pipe conduits accessories. Ordinary steel threaded pipes ("gaspipes") (N236)
Heavy steel threaded pipes ("steampipes") (N237)
Pipe conduits and accessories. Junction dimensions for flanges for pressures up to and including I-64, II-50, III-40 (N238)
Cast-iron flanges for pressures I-6, II-5 and I-10, II-8 (N242)
Technical drawings. Sizes. Instructions for folding and attaching (N379)
Technical specifications for building. Strains (N791) Bendings (N792) Buckling in steel (N793) Buckling in wood (N794) Special specifications for steel constructions (N795)

Police Recommend Standard Traffic Regulations

Standard traffic regulations, which would be effective from Virginia to Prince Edward Island, Canada, were proposed January 20 at a meeting of executives of more than a score of police organizations from New England, the Middle Atlantic seaboard states, New Brunswick, Nova Scotia, and Prince Edward Island. The meeting resulted in the organization of the Eastern division of a new branch of the International Association of Chiefs of Police.

Need Standard Methods For Inspection of Ropes

There is a need for standard methods for the examination of gears, ropes, pulleys, chain, belts, and similar special hazards, said P. N. Bushnell, manager of the personnel department, Missouri Portland Cement Company, St. Louis, at the annual meeting of the Cement and Quarry Section of the National Safety Congress.

Standard for Steel Pipe Flanges And Flanged Fittings Revised

by

Dr. Collins P. Bliss[1]

Chairman, Sectional Committee On Pipe Flanges and Fittings (B16)

Types of flanged fittings covered by new standard

400-lb steel tee showing ¼ in. raised face and spot facing

1500-lb steel reducer showing ½ of tongue and groove joint and spot facing

600-lb steel lateral showing ¼ in. raised face and spot facing

90-deg steel elbow with half of tongue and groove joint, showing spot facing

Photos courtesy Reading, Pratt & Cady Division, American Chain and Cable Co.

THE new steel flange standard is out. After two years of intensive work on the part of the members of Subcommittee No. 3, the Sectional Committee on the Standardization of Pipe Flanges and Fittings (B16) presents a completely revised and enlarged edition of its standard for Steel Flanges and Flanged Fittings (B16e-1939).

In number of pages it is more than double the size of the 1932 edition and now has a two-page index carefully cross-referenced for the convenience of the user of this popular standard.

It was not long after the completion of the 1932 revision, which carried the pressure range up to and including 1500 lb, that the committee realized industry would soon demand pipe flanges and flanged fittings for 2500 lb and higher. Then from the west came the request for the inclusion of a complete line of welding neck companion flanges for all pressures from 150 to 2500 lb inclusive. Here the committee included also a recommended practice for the details of welding bevel.

A consideration of this addition led naturally to the addition of all types of screwed and loose companion flanges with hubs. Then blind flanges were also included.

The most important and by far the most extensive change was the addition of a complete line of ring joint flange dimensions for pressures from 150 to 2500. These flanges had been developed for use in oil refineries by a committee of the American Petroleum Institute in cooperation with the manufacturers functioning through the Manufacturers' Standardization Society of the

[1]Engineering Index Service, New York; representing the American Society of Mechanical Engineers.

American Standard for Steel Pipe Flanges and Flanged Fittings (B16e-1939), prepared under the administrative leadership of the American Society of Mechanical Engineers; the Heating, Piping, and Air Conditioning Contractors National Association; and the Manufacturers Standardization Society of the Valve and Fittings Industry, is now available at $1.25 per copy. It may be ordered through the American Standards Association office, and ASA members are entitled to 20 per cent discount.

Valve and Fittings Industry. Naturally the addition of this new type of joint made increased ratings possible for certain types of service. So new pressure-temperature tables for the carbon steel and alloy steel flanges and flanged fittings employing all of the regular types of joints as well as the ring type were compiled and finally accepted after much drafting and redrafting. In these revised ratings for carbon steel flanges and flanged fittings the 2500 lb standard allows a pressure of 4170 lb at 100 F and 1670 lb at 850 F when the regular types of joints are employed and 5000 lb at 100 F and 1670 at 850 F with the new ring joints, all ratings referring to use with water and steam. With oil the upper rating is increased to 1000 lb at 1000 F for all types of joints, but the 100 F rating remains the same as previously stated for water and steam.

When these ratings for carbon steel fittings were finally completed the committee decided to add rating tables for flanges and fittings made of carbon-molybdenum and equivalent alloy steels. These ratings carry the pressure ratings for the 2500 lb standard up to 6000 lb at 100 F for water, steam, and oil and 1675 lb at 1000 F when ring joints are employed. With the other types of facings these steel flanges and flanged fittings are rated at 5000 lb at 100 F and 1580 lb at 1000 F for water, steam, and oil.

Less spectacular but equally valuable additions to this standard are:

(1) A full page cut illustrating the approved method of designating location of tapped holes for drains

(2) an improved system of marking steel flanges and flanged fittings

(3) the increase in the thickness of the 150 lb loose flanges, sizes $3\frac{1}{2}$ in. and smaller.

(4) the addition of a table giving details of the design or reducing screwed flanges

(5) the inclusion of seven new tables of lengths of alloy steel bolt studs for the entire pressure range from 150 lb to 2500 lb and for the various types of flange facings

(6) the addition of small sizes on several other standards and the adoption as an American Standard of the previously proposed dimensions for the 12 to 14 in. inclusive sizes in the 1500 lb series.

It is gratifying to note that the rather rapid changes in industrial practice, first into higher pressures and temperatures, then the effect of these on different types of fittings and the consequent necessity for special materials in the matter of alloys, have all been successfully handled because of the diversified representation on the committee which has been responsible for the production of this standard.

This would seem to indicate generally that the method of selection of committee members under ASA procedure produces an efficient and competent group for the promulgation of standards, acceptable to industry as a whole.

400-lb WSP Cast-steel Flanged "Y", 20 x 16 x 16 in.

Photo courtesy Walworth Company

This article is an abstract from an article in *Valve World*, January-February, 1939, published by the Crane Company, and is used by INDUSTRIAL STANDARDIZATION through the courtesy of that organization.

New Standard for Cast-Iron Fittings Becomes Effective October 1

by

A. M. Houser[1]

Chairman, Subcommittee 1 on Cast-Iron Flanges and Flanged Fittings, Sectional Committee on Standardization of Pipe Flanges and Fittings

THE standard now known as the Class 125 Cast Iron Flanges and Flanged Fittings was first recorded in a pamphlet published by the American Society of Mechanical Engineers in the year 1894. Up to that time the manufacturer was compelled to develop his own flange dimensions, guided only by his personal interpretation of the needs and dictates of the trade. It is unforunate that we have no record of the various dimensions in common use during this early period for it would be most interesting to compare them with those employed in present practice.

The use of flanged joints was apparently unusual before 1886, as indicated by the following typical example of a common occurence at that time.

An office building being erected in Chicago was having some large piping installed in the basement and the question arose as to how to connect two sections being installed simultaneously. The foreman of the pattern shop was sent to this building to make a study of the situation. He recommended that fittings with bolted flange connections be made up for the job, and it was left up to him to design the flanged fittings that he had recommended. This experience illustrates how such an operation as the connecting of two sections of piping often constituted a very real problem at that time; it also indicates what an urgent need there was for flanged fittings.

The ease and expedition with which such work is handled at the present time is a "far cry" from the laborious procedure involved in making this piping installation in 1886.

As the use of flanged fittings increased, it was natural that a general movement towards detailed standardization of the entire line of products should be started. This trend is recorded in many publications of flanged fitting dimensions, drilling dimensions, and shell thicknesses, all of which were issued prior to the organization of the American Engineering Standards Committee in 1918.

The reason for these publications was that the industry began to realize the need of some definite action toward standardization if interchangeable fittings were to be made available to the trade. In the establishment of a definite practice in the manufacture of flanged fittings such efforts were the only means by which any organized group was able to get results.

About 1910 the National Association of Master Steam and Hot Water Fitters considered the setting up of a definite practice sufficiently important

[1]Engineer of Standardization, Crane Company; vice-chairman of the Manufacturers' Standardization Society of the Valve and Fittings Industry.

to begin a study of the subject, tabulate the dimensions appearing in current catalogs, and outline a definite set of proposed dimensions. The American Society of Mechanical Engineers, being interested in this standardization activity, cooperated in the work, and with the aid of the manufacturers made quite an extensive study of the fitting problem. The differences appearing in the various proposed dimensions were compromised through a special committee appointed by the ASME. This Society, being standardization-conscious and a national engineering organization, was able to be of material assistance in getting the job finished.

Sectional Committee Organized

The American Engineering Standards Committee (now the American Standards Association) was founded in 1918, but it was not until three years later that the Sectional Committee on Pipe Flanges and Flanged Fittings was organized under its procedure. This committee promptly initiated work on the cast iron flanged fittings project which culminated in the establishment of the American Standard B16a in 1928. Work on the present edition, which is scheduled to become effective October 1, 1939, was begun by the committee in the Spring of 1936.

A standard of this type or class brings up many problems and it should be explained that it was only through considerable compromise on the part of a number of committee members that the standard, as now set up, was established.

The establishment of a standard generally presents problems that are not easy to compromise, due principally to accepted commercial practice as well as the cost of making changes in equipment, and the matter of stock on hand which does not conform to the changes. Thus it can be readily seen that the revising of an old standard like this one presents real standardization problems.

With changing conditions come changes in processing and the use of new materials in processing, all of which affect the changes that must be considered when revising a standard. Safety codes also influence the use of certain materials for given purposes. As these codes become more firmly established by common use, revisions from time to time shift the use of various products to agree with the new ideas.

In the case of the Class 125 Flanged Fittings, the refinements in tolerances and the revised ratings and changes in marking required to establish properly these ratings have constituted a considerable expense to the manufacturer of these products. The problem of using up present stocks in users', jobbers' and manufacturers' warehouses is a feature that affects all interests.

The following extracts from the "Introductory Notes" point out the salient features that are covered in the latest revision of American Standard B16a.

The American Standard for Cast-Iron Pipe Flanges and Flanged Fittings, Class 125 (B16a-1939), developed under the leadership of the American Society of Mechanical Engineers, the Heating, Piping and Air Conditioning Contractors National Association, and the Manufacturers Standardization Society of the Valve and Fittings Industry, is now available at 60 cents per copy. Members of the American Standards Association ordering copies through the ASA office are entitled to 20 per cent discount.

Pressure Rating

For maximum saturated steam service pressures of

125 lb per sq in. (Gage) sizes 1 to 5 in., incl
100 lb per sq in. (Gage) sizes 6 to 12 in., incl
80 lb per sq in. (Gage) sizes 14 to 24 in., incl
50 lb per sq in. (Gage) sizes 30 to 48 in., incl

For maximum water service pressures at or near the ordinary range of air temperature

175 lb per sq in. (Gage) sizes 1 to 12 in., incl
150 lb per sq in. (Gage) sizes 14 to 48 in., incl
for flanges only.[2]

Marking

All fittings shall have marks cast on them indicating the manufacturer, and figures indicating the service pressure rating. Sizes up to and including 5 in. shall carry the figures "125" indicating the saturated steam service pressure rating. Sizes 6 to 12 in., inclusive, shall carry figures "100" indicating the saturated steam service pressure rating. Sizes 14 to 24 in., inclusive, shall carry the figures "80" indicating the saturated steam service pressure rating. Sizes 30 to 48 in., inclusive, shall carry the figures "50" indicating the saturated steam service pressure rating. These

[2]It will be noted that water service ratings as shown for sizes 14 in. and larger in this standard are applicable to flanges only and not to fittings. Water service ratings on fittings 14 inches and larger are withheld in this issue of the standard pending receipt of final report on research work which is now being conducted by ASA Sectional Committee A21.

Courtesy "The Valve World," published by the Crane Co.

Special cast-iron side outlet Y-Bend applying standard dimensions

marking requirements comply with principles established in MSS Standard Practice SP-25.

The dimensions prescribed in this standard are based upon gray iron castings of high quality produced under regular control of chemical and physical properties by a recognized process. The manufacturer shall be prepared to certify that his product has been so produced and that the chemical and physical properties thereof, as proved by test specimens, are equal to the requirements specified in ASTM Specification A126. Flanges and fittings 12 in. and smaller shall be made of material equal to the requirements of ASTM Specification A126, Class "A" regular gray iron.

Flanges and fittings 14 in. and larger shall be made of material equal to the requirements of ASTM Specification A126, Class "B" higher strength gray iron.

It is intended that material required by this standard shall be in accordance with these requirements or as required in the latest edition of ASTM Standard Specifications for Gray-Iron Castings for Valves, Flanges and Pipe Fittings (A 126).

Wall Thickness Tolerance

Patterns shall be designed to produce castings having the wall thicknesses given in the tables. The wall thicknesses of the castings at no point shall be less than 87½ per cent of the dimensions given. These fittings shall be designed to withstand, without showing leaks, hydrostatic test pressures of twice the rated steam pressure. Hydrostatic tests of cast-iron fittings covered by this standard are not required unless specified by the user.

Spot Facing

Flanges.—The bolt holes of these cast-iron flanges need not be spot faced for ordinary service except, as follows: In sizes 12 in. and smaller when rough flanges, after facing, are oversize more than $\frac{1}{8}$ in. in thickness, they shall be spot faced to the specified thickness of flange (minimum) with a plus tolerance of 1/16 in. In sizes 14 to 24 in. inclusive when rough flanges, after facing, are oversize more than 3/16 in. in thickness they shall be spot faced to the specified thickness of flange (minimum) with a plus tolerance of 1/16 in. In sizes 30 in. and larger when rough flanges, after facing, are oversize more than $\frac{1}{4}$ in. in thickness they shall be spot faced to the specified thickness of flange (minimum) with a plus tolerance of $\frac{1}{8}$ in.

Fittings.—The bolt holes of the flanges on these cast-iron fittings need not be spot faced on sizes smaller than 18 in. for ordinary service, except as required for oversize thickness of flanges as indicated above. The bolt holes of *all* flanges on fittings 18 to 24 in. inclusive shall be spot faced to the specified thickness of the flange (minimum) with a plus tolerance of 1/16 in., and of *all* flanges on fittings sizes 30 to 48 in. inclusive they shall be spot faced to the specified thickness of the flange (minimum) with a plus tolerance of $\frac{1}{8}$ in.

How New Cast-Iron Fittings Standard Differs From 1928 Edition

Pressure Rating and Title of Standard

The pressure ratings for all flanges and fittings, sizes 6 in. and larger, have been revised downward to conform to modern practice in their application. This keeps the safety factors on a more conservative basis. Due to the reduction in pressure rating of the larger sizes the title of the Standard has been changed to "Cast-Iron Pipe Flanges and Flanged Fittings, Class 125."

Marking

It will be necessary for manufacturers to change the pressure marking on all fittings, sizes 6 in. and larger, due to the reduction in pressure ratings.

Material

The section of the Introductory Notes relating to material has been revised to conform to ASTM Specifications A 126-30 Revised, which was developed to cover this type of cast iron, subsequent to the promulgating of the previous edition of this Standard.

Wall Thickness

Wall thicknesses of fittings, sizes 3 in. and smaller, have been revised in order to establish the actual minimum dimensions that have been in extensive use in commercial practice. The previous edition of the Standard showed the same wall thickness (7/16 in.) for all sizes up to and including 3½ in., not allowing any reduction in thickness as the size of the fitting became smaller. This is corrected in the new edition.

Wall Thickness Tolerance

A section on permissible wall thickness tolerance has been added to the Introductory Notes to cover well established inspection requirements.

Spot Facing and Length of Bolts

The section of the Introductory Notes dealing with spot facing has been made more definite and tolerances on maximum flange thicknesses have been established. This permits determination of bolt lengths to accommodate the maximum flange thicknesses, and bolt lengths, revised accordingly, are shown in Table 2.

Drain Tappings

A section on drain tappings has been provided in the Introductory Notes and Fig. 2 illustrating the Method of Designating Location of Tapped Holes for Drains has been added.

Hearings Scheduled to Consider Cream and Milk Standards

The Department of Agriculture announces a public hearing on May 1 to receive evidence to be used as the basis for regulations establishing standards of identity for cream, whipping cream, evaporated milk, dried skim milk, and sweetened condensed milk. The hearing will begin at 10:00 A. M., in Rooms A, B, and C, Departmental Auditorium, Constitution Avenue, between 12th and 14th Streets, N. W., Washington, D. C. Certain label statements for these products will also be considered.

All interested persons are invited to attend this hearing and offer relevant evidence either in person, by representative, or by affidavit. Affidavits will be received by mail up to the day set for the hearing. The lack of opportunity for cross-examination will be taken into account in the consideration of such affidavits. They should be addressed to Frank S. Hassell, Room 2309, South Building, Department of Agriculture, Washington, D. C., who has been designated by the Secretary of Agriculture as presiding officer.

The hearing will be conducted in accordance with the Rules of Procedure for Hearings Required Under the Federal Food, Drug, and Cosmetic Act as published in the Federal Register of January 13, 1939.

The definitions and standards of identity proposed are published in the March 28, 1939, issue of the Federal Register, which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price of a single copy is 10 cents.

Revision Extends Scope of Standard On Ground-Glass Joints, Stoppers

A third revision of the Commercial Standard on Interchangeable Ground-Glass Joints, Stopcocks, and Stoppers, CS21-39, which extends the scope of the standard to include short length joints, primarily for weighing bottle covers, has been accepted and approved for promulgation by the United States Department of Commerce, through the National Bureau of Standards.

The purpose of the standard is to provide standard dimensional requirements for obtaining, within practical limits, interchangeability in ground-glass joints, stopcocks, and stoppers for ordinary laboratory and industrial work. It covers dimensional interchangeability only and does not involve physical or chemical characteristics of glass. It covers interchangeable ground-glass joints for laboratory and industrial glassware; interchangeable straight-bore, ground-glass stopcocks; and ground-glass stoppers.

Mimeographed copies of the standard are available from the National Bureau of Standards without charge until published copies are ready.

Piping Contractors Association Issues New Book on Engineering Standards

A new edition of the Heating, Piping, and Air Conditioning Contractors Engineering Standards has just been published.

The new book, which is in the form of a loose-leaf binder, contains five parts: Part I, covering the figuring of radiation of boilers, contains new pages on various types of insulation as applied to building structures.

Part II, sizing of boilers. The Foreword of this part has been changed to bring it into agreement with the foreword of the Net Load Recommendations for Heating Boilers. Part II of the Engineering Standards is used in the sizing of boilers which are not listed in the Net Load Recommendations.

Part III, referring to pipe sizes, has been increased in size to cover the material necessary for laying out mechanically circulated high-temperature hot water heating systems.

Part IV, containing dimensional standards, has been revised to bring it up to date and to give the members the benefit of the latest work of the Sectional Committee on Standardization of Pipe Flanges and Fittings (B16).

Several additions and revisions have been made in Part V, which contains the data on air conditioning. A complete rearrangement of the material on summer cooling, and addition of new material, makes this section useful as reference material.

Copies are available from the Heating, Piping and Air Conditioning Contractors National Association.

League of Nations Sets Standards for Drugs

From *Science News Letter*

THE League of Nations may not be able to stem the "rule of might" disease that is creeping over the world, but it continues to have scientific appendages that play important roles in the lives of the peoples of various nations.

Antitoxins, sera, drugs, vitamins and sex hormones, about 30 useful substances the activity of which can be measured only through use of laboratory animals, are standardized through international action fostered by the League of Nations Organization.

Curiously enough, it was war-time experience that played a leading role in convincing that national standards are not enough.

"Many deaths could have been averted," an official report says, "if the sera used during the war had been assayed in relation to a single standard. Doctors would not have been betrayed by the unitage given on foreign ampoules into injecting quantities of serum which they had good reason to regard as sufficient, but which were in fact inadequate, since the assay had been effected in terms of a unit of lesser potency than that to which they were accustomed."

Because drugs and biological products are exported and imported in peace times as well, it would be easier for manufacturers and safer for physicians and patients if uniform, international standards were used. And without standardization, how can therapeutic results on two sides of a frontier be compared?

It is not surprising that as early as 1921 the League's Health Committee called an international conference on this problem. Keeping pace with scientific progress, the sex hormones are the latest class of substances for which standards are set. Written standards are not enough; national laboratories in Copenhagen and London keep and distribute international standard preparations on behalf of the League Health Organization.

Diphtheria, tetanus, staphylococcus, and gas-gangrene antitoxins, anti-dysentery and anti-pneumococcus sera, insulin, pituitary extract, vitamins A, B_1, C and D, digitalis, salvarsan, neosalvarsan, and sulfarsphenamine are among the substances standardized.

Serologists Work on Standards For Serums and Antitoxins

Reports of the work being done by the Permanent Commission on Biological Standardization recently included reports of a meeting of Serologists in Paris, October 19th-22nd, 1938. Discussions at the meeting of work on standards for tetanus antitoxin, anti-snake venom serum, and gas-gangrene antitoxins were published in the Bulletin of the Health Organization for October, 1938.

AREA Elects Hastings President, Committees Report on Standards

Engineering Section of Association of American Railways Acts at Annual Meeting

At its fortieth annual meeting in Chicago March 14, 15, and 16, the American Railway Engineering Association elected officers for 1939 and heard reports of 27 standing and special committees. E. M. Hastings, chief engineer of the Richmond, Fredericksburg, and Potomac Railroad, Richmond, Va., was elected president; and F. L. C. Bond, vice-president and general manager, Canadian National Railroad, Toronto, Ontario, second vice-president. G. S. Fanning, chief engineer, Erie Railroad, Cleveland, Ohio, who was second vice-president last year, automatically became senior vice-president.

F. E. Morrow, chief engineer of the Chicago and Western Illinois-Belt Railways, retiring president of the Association, reviewed the progress of the organization for the last year. "One of our major activities," he said, "is the constant survey of our fields of activity in order to keep our membership abreast of developments. Our committees are maintained for this purpose. It is their function to separate the wheat from the chaff and formulate our recommended practices."

The primary function of the Association of American Railroads in its relation to the American Railway Engineering Association is to coordinate its activities with those of other divisions of the AAR for the progressive improvement of the railways as a transportation agency, said J. W. King, newly elected vice-president of the AAR Operations and Maintenance Department. He said that although the specifications developed by the AREA committees may not be widely used in their entirety, they are important guides for the various railroads in drafting similar specifications.

The committee reports showed activity during the past year in revising the recommendations published in the AREA Manual and in preparing new recommendations.

The Committee on Standardization reported on the three phases of its work, which are:

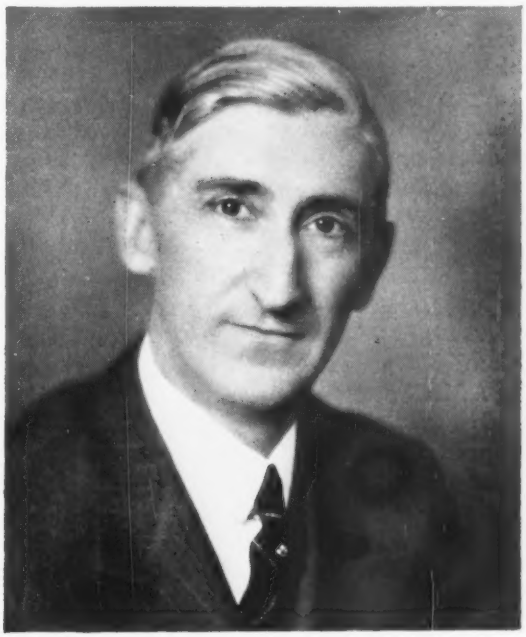
1. **To determine what AREA recommended practices should be advocated for general use on railroads**
2. **To determine what AREA recommended practices should be sponsored as projects for national standardization**
3. **To maintain contact with standardization bodies and keep the Association informed on important matters developed by such contact.**

The committee recommended that the members study and make use of the specifications and recommended practices in the AREA Manual.

No projects have been recommended for national standardization during the past year.

The Committee on Economics of Railway Location and Operation submitted two sample work sheets to be used as an aid in computing the speed-tractive effort curves of steam locomotives using super-heated steam. One of these sheets is for use when design data are not available and the other for use when such data are available. The chief purpose of speed-tractive effort and horsepower curves is to provide a basis for calculating the performance and the fuel consumption of the locomotive in service, and the committee presented a method for making such calculations.

Formulas and sample work sheets for calculating speed-tractive effort and horsepower output



Courtesy Railway Age

E. M. Hastings

of locomotives in the two general classes of electric locomotives—direct current and alternating current—were presented. A form for calculating the braking effort and output regenerated by direct-current locomotives and a form for calculating the tractive effort and horsepower output of oil-electric locomotives were also presented, and recommended for inclusion in the Manual.

The chief factors to be considered in determining a method for classifying grade crossings as to hazards were analyzed in a report which was based on both the physical characteristics of the crossing, and the railway and highway traffic passing over the crossing. The classification when completed will be used to determine the order in which grade crossings are to be improved.

A list of 17 requisites for automatic crossing gates, which had already been adopted by the Signal Section, was recommended for publication in the Manual.

The Committee on Track submitted revised plans for a clay pick; a tamping pick; track wrenches for American Standard heavy and regular nuts; a claw bar, design No. 2; and for track chisels, designs No. 1 and No. 2. The plans supplement the information previously given and are expected to assist in the manufacture of these tools, without making any changes in design.

Revised plans were adopted as recommended practices for crossings with solid manganese frogs and interior rolled closure rails.

The Committee on Rail submitted a number of revisions of the Specifications for Heat-Treated Carbon Steel—Alloy Steel Track Bolts—to conform to the specifications on the same subject adopted by the American Society for Testing Materials. The rail manufacturers have offered to accept, without increase in the base price of rails, the inclusion of the Every-Ingot Nick and Break Test for the definite indication of "X-Rayls" in the "A" rails, the committee reported. Revisions to include this test in the Specification for Open Hearth Steel Rails were recommended. The committee's recommendations were adopted.

Consideration was given to the possibility of adopting a longer rail as standard length in place of the present 39-foot standard. Seventeen of 52 railroads to which a questionnaire was sent favor the use of a 78-ft rail; two favor a 50-ft rail; eight a 45-ft rail; and seven favor the present 39-ft rail, the Committee on Rail reported. A tabulation of comparative costs of the different lengths, presented by this Committee, showed benefits of $1.85 per gross ton of rail for the 45-ft length and $6.82 for 78-ft rail as compared with the 39-ft lengths. The report was presented as information.

Accept Non-Standard Ties

Inexperienced inspectors have been responsible for acceptance of ties in sizes not warranted by their dimensions and not in accordance with standard specifications, the Committee on Ties reported. The committee based its report on an inspection of seven commercial wood-preserving plants in Illinois and Ohio carried out in order to observe 2,000,000 ties accepted by 11 railroads. The committee reported that "the notable difference in the work of new men and old men demonstrates that capable inspectors are not every-

AREA Members Active In ASA Activities

E. M. Hastings, newly elected president of the American Railway Engineering Association, is active in the work of the American Standards Association as an alternate representative of the Engineering Division of the Association of American Railroads on the ASA Standards Council.

The AREA, serving as the engineering division of the AAR, has an important part in ASA activities. This division is represented on 48 sectional committees of the American Standards Association. Through the AAR it is also represented on the Electrical Standards Committee, the U. S. National Committee of the International Electrotechnical Commission, the Highway Traffic Standards Committee, the Safety Code Correlating Committee, and the Mechanical Standards Committee.

J. C. Irwin, past president of the American Railway Engineering Association, is a member of the ASA Board of Directors, and was chairman of the Standards Council from 1934 through 1936.

A. R. Wilson, Pennsylvania Railroad, also a past-president of the AREA, now represents railroad engineering on the Standards Council, participating in decisions on new undertakings as well as on approval of all American Standards. W. F. Cummings, Boston and Maine Railroad, and E. K. Post, Pennsylvania Railroad, with Mr. Hastings, are alternate representatives.

where readily available and cannot be trained in a day or a week."

The Committee on Iron and Steel Structures proposed new instructions for the mill inspection of structural steel, new instructions for inspecting the fabrication of steel bridges, and new instructions for the inspection of bridge erection.

The Committee on Wood Preservation reported progress in its study of specifications for treating processes and for the treatment of wood, but has not made sufficient progress to submit a revision of the present standards. The committee's recommendation that the AREA accept an alternative method for water determination, adopted by the American Society for Testing Materials and the American Wood Preservers Association, was approved.

The Committee on Masonry recommended a number of deletions, substitutions, and additions in the sections on Cement, to conform to recent changes made by the American Society for Testing Materials. This same committee presented a set of specifications for pile foundations and its recommendations concerning the scope, purpose and necessity, article design, allowable load on piles, and loading test were adopted by the AREA for publication in the Manual.

Specifications for placing concrete by pumping, also submitted by this committee, were adopted.

Requirements for pipe which is bought locally and which cannot be tested according to existing specifications were presented. These requirements must be observed if such pipe is to be considered capable of carrying the assumed loads. The present approved specifications for reinforced concrete culvert pipe are intended only for use where the pipe is manufactured and tested as required by the specifications. The new specifications which were adopted for publication in the Manual will apply to pipe which cannot be tested without considerable expense.

Revisions of the specifications for railway scales were proposed by the Committee on Yards and Terminals and accepted by the Association for inclusion in the Manual.

Suggested changes in the table of dimensions of cedar piles for highway bridges to bring this table into conformity with dimensions adopted by the ASTM were approved.

The Committee on Wood Bridges and Trestles reported that it had thoroughly reviewed the specifications of the American Association of State Highway Officials for overhead highway bridges and found that the portions relating to wood construction are such as to result in a satisfactory highway bridge.

World Automotive Congress Meets May 22-June 8

Sixty technical sessions representing every professional activity connected with the manufacture and use of motor vehicles, aircraft, and tractors are scheduled for the World Automotive Engineering Congress, sponsored by the Society of Automotive Engineers, which will convene in New York, Indianapolis, Detroit, and San Francisco from May 22 to June 8. Members of 30 engineering societies in 15 foreign countries have been invited to participate in the activities of the Congress.

The meetings in New York (May 22-26) cover aircraft; aircraft engine; fuels and lubricants; passenger cars; passenger-car bodies; transportation and maintenance; truck, bus, and railcar; Diesel engines; and tractor and industrial power equipment.

No technical session is scheduled for the visit to Indianapolis (May 29-30), but interest will center around the 500-Mile International Sweepstakes and the mechanism of the cars which participate.

In Detroit (May 31-June 2), delegates will attend a session arranged by the Production Activity, as well as visit some of the automobile plants.

The meetings in San Francisco (June 6-8) will include technical sessions under the auspices of the SAE Aircraft, Transportation and Maintenance, Fuels and Lubricants, and Diesel Engine Activities.

General sessions are also being arranged for New York and San Francisco.

Members of the American Standards Association are invited by the Society of Automotive Engineers to attend the meetings and make whatever contribution they may wish in this gathering of automobile and allied engineers and technologists.

Non-Standard Medical Supplies Seized by U. S. Department

Departures from the official standards were the basis of libel actions against 496 cans of anaesthetic ether, 59 cylinders of nitrous oxide gas (laughing gas), 156 bottles of sweet spirits of nitre, and 888 bottles of paregoric, the U. S. Department of Agriculture announced recently. In addition, 647 pounds of surgical absorbent cotton, 1,190 packages of cotton swabs, and 24 surgical sutures were seized for insterility.

ASTM 1938 Proceedings Include Tentative Standards, Committee Reports

NEW and revised tentative standards of the American Society for Testing Materials as well as committee reports and technical papers are published in the 1938 ASTM Proceedings, just issued, in two volumes.

Part I includes reports of 50 committees and some 162 specifications and tests prepared for the first time in 1938 or revised. Ten of the reports concern ferrous metals, fatigue of metals, and effect of temperature on the properties of metals. This latter report also includes papers covering long-time creep tests of certain steels, effects of manufacturing variables on the creep resistance of steels, acceptability tests for high-temperature characteristics, and other test work of the joint committee. Eight of the reports cover non-ferrous metals, and include an appended item on the effect of foundry variables on the mechanical properties of sand-cast tension test specimens.

There are extensive reports covering cement, lime, refractories, concrete and concrete aggregates, gypsum, concrete pipe, glass and glass products, manufactured masonry units, natural building stones and slate, and plastering.

Other reports include paint, petroleum products, gaseous fuels, road and paving materials, coal and coke, rubber products, soaps and detergents, textile materials, soils for engineering purposes, water for industrial uses, and plastics. Methods of testing, including a report on a study of cup testing of sheet steel and a paper on testing thermometers, spectrographic analysis, chemical analysis of metals, metallography, and radiographic testing are also included in Part I.

Forty-five technical papers are published in Part II and in addition the Edgar Marburg Lecture on "The Torsion Test" is included. Ten papers comprise the Symposium on Impact Testing. Of the 33 other technical papers in Part II, 13 relate to ferrous and non-ferrous metals; eight cover cement and concrete, lime, ceramics, and masonry materials; and twelve cover miscellaneous topics, including adherence of organic coatings to metals, rosin crystallization, studies in the oxidation of mineral transformer oil, and a machine for testing highway subgrade soils. Other papers deal with statistical methods as an aid in revising specifications, and estimation of sodium in water supplies by an indirect method.

Copies of Parts I and II of the 1938 ASTM Proceedings are available at $5.50 for each part in stiff paper cover; $6 in cloth, and $7 in half-leather, from the American Society for Testing Materials, 260 S. Broad Street, Philadelphia.

Underwriters Safeguard Food-Preparing Machines

Safety requirements for domestic and commercial electric food-preparing machines, to prevent cutting or mashing the hands of users, have now been incorporated in the Standard for Motor Operated Appliances of the Underwriters' Laboratories. This standard establishes requirements which must be met by such appliances before they are approved by the Laboratories.

It stipulates that guards should be used around the driving mechanisms of food-preparing machines so that moving parts, such as pulleys, belts, gears, and the like, will not be exposed for accidental contact. For the protection of the fingers of users the largest opening allowed in such a guard should not be more than $\frac{3}{8}$ in. in width. A cutting or slicing mechanism shall be guarded except where exposure of the blade or cutter is necessary for the functioning of the device. To prevent hand injuries in manual feed devices, the inside diameter of the hopper or feed opening is limited to a maximum of $2\frac{1}{2}$ in.

All new devices submitted to the Underwriters' Laboratories for listing as approved appliances must comply to these new safety requirements.

South African Farmers Use National Grade-Mark System

Rapid progress was made during the past year in the use of the National-Mark Scheme started by the government of the Union of South Africa on a voluntary basis two years ago in Johannesburg, reports the *Consumer Education Service*, published by the American Home Economics Association. Under this scheme, farmers assisted by government experts grade their products according to standards of quality, and market them under a national trade-mark. The more important products so graded are tomatoes, pawpaws, avocados, mangoes, pineapples, lemons, naartjes, grapefruit, peaches, apricots, plums, pears, apples, grapes, strawberries, melons, potatoes, many vegetables, eggs, meat, and bacon.

High Lights on Standards

From the Tenth Annual Convention, Greater New York Safety Council

These excerpts from speeches made during the Tenth Annual Convention of the Greater New York Safety Council indicate what the speakers believe is needed in development of standards to decrease death and injury from accidents. Some of these excerpts do not directly refer to the standards in question but all of them have some bearing on standards that have either been completed or in the opinion of the speaker should be developed. The accident cause code; the code for protection of heads, eyes, and respiratory organs; and the National Electrical Code are some of the standards which either by name or inference are referred to by the speakers.

The general method of procedure of the American Standards Association, which brings together all interests concerned with a standardization problem, is recommended by several speakers for new work such as development of safety standards to help eliminate some of the accidents that occur in the home.

Heads and Eyes

"Employers and employees of American industry are losing $50,000,000 a year as the result of preventable eye injuries, and the blind population of the country is being needlessly increased each year as the result of accidental injuries to the eyes. There is no longer any need for the blinding of workers in American industry. The industrial accident and disease hazards affecting the eyes are now commonly known; methods of eliminating these hazards or of protecting workers against them have been thoroughly demonstrated; devices which provide protection against almost every type of eye accident are now available. Some concerns have succeeded in reducing the frequency of eye injuries to the point where the blinding of a worker in their plants has become a rare instead of a commonplace occurrence. The accident prevention methods used by these corporations successfully have been widely reported by the National Safety Council, the National Society for the Prevention of Blindness, and by other interested organizations."—***Louis Resnick, Director of Industrial Relations, National Society for the Prevention of Blindness.***

Standard Work Conditions

"Many organizations have found that the spirit of competition between individual workers and between groups of employees . . . can be encouraged advantageously in the form of friendly competition for the purpose of eliminating accidents and injuries to employees by improving housekeeping and general work methods. . . .

"Standards can be set for the measurement of housekeeping conditions in various departments, divisions, or plant units, and should provide the basis of comparison among the competing units in such a plant housekeeping contest. . . .

"In establishing standards of proper work conditions and procedures many source references are available through which information relating to the technical phases of management can be obtained, such as the following: National Safety Council; American Standards Association; National Board of Fire Underwriters; Underwriters' Laboratories, Inc.; U. S. Bureau of Mines; Federal, State, and Industrial departments; engineering societies; accident prevention associations; procedures recommended by insurance companies; mutual exchange of such information among individual industrial organizations."—***H. R. Bixler, assistant to the manager of Industrial Relations, Units of Union Carbide and Carbon Corporation.***

Standard Reports of Accident Causes

—On the Highway

"The reduction of speed, slowing down at intersections, supervision of streets in the closely built-up areas, observance of stop signs and signal lights are police enforcement problems, but equally important is the intelligent investigation of all accidents so that when the opportunity comes for publicity, the real causes of accidents, backed up by facts, can be pointed out.—***John J. Parker, Superintendent of the Police Department, Providence, R. I.***

—At School

"A continuing survey of accidents occurring to all school children may be maintained through the use of an accident reporting system. In order to have an intelligent understanding of the accident situation, it is necessary to know how many accidents are taking place, the kinds of accidents and types of injuries, a clear description of the causes, the place, time, etc. Some school systems have prepared their own forms, while many others use the standard form issued by the National Safety Council.—***Kenneth N. Beadle, Director, Education Division, National Conservation Bureau.***

Safety at Sea

"Safety at sea depends, of course, upon a number of factors, among which may be mentioned proper construction and equipment according to approved standards." — ***Rear-Admiral Russell R. Waesche, Commandant, United States Coast Guard.***

Success in Safe Electricity

"The yearly average number of accidents in New York [from electricity] for the four-year period ending with 1935 was only 60 per cent of the average for the five years ending June 30, 1930. It is believed that the experience in New York is a fairly good index of what is happening in the entire country.

"It is apparent, therefore, that considerable progress has been made in the control of electricity hazards. The record is a tribute to manufacturers and users of electrical equipment, governmental bodies, insurance companies, and others interested in the safe use of electricity. Much of the credit for this improvement rightfully belongs to those who sponsored, formulated, and observe the requirements and recommendations of the National Electrical Code and the National Electrical Safety Code. No safety engineer should be without copies of these codes."—***C. L. Keene, supervising engineer, Ocean Accident & Guarantee Corp., Ltd., New York.***

Safety in the Home

"The first job to be undertaken for distinct home safety activity is to . . . lead out the experts, make them pool their technical knowledge, experience, and skill, and bring it all to bear upon the problem of home safety instruction.

"First of all there are the architects who plan and specify how dwellings are to be constructed. They should know all there is to know about home safety factors to be incorporated in building our homes. . . .

"This applies as well to public departments that issue building permits and enforce building laws, ordinances, and regulations. . . .

"Then there are the manufacturers of household equipment, appliances, implements, utensils, gadgets. Their education for accident prevention is promoted by laboratories that test the safety aspects of their products and give or withhold approval. Questions might be raised as to standards for approval. Are products approved because they are absolutely safe and foolproof, or because they are less dangerous than others on the market? Does laboratory approval guarantee that these protective devices will function automatically? Or may these devices fail to function at times and at critical moments? Are safety devices advertised more for their sales values than for actual protection they afford? . . .

"There are literally a host of agencies and professions that serve families within their homes. There are public utility services; such as water, gas, electricity, and telephone companies or departments. Some of them not only supply services, but also sell appliances to householders. . . .

"As for the professions that daily enter homes, there are the doctors, nurses, family social workers, home demonstration agents, visiting house-

keepers."—***John Melpolder, Director, Home and Farm Accident Prevention Service, American National Red Cross.***

Coordination Is Goal

"What we should be seeking then, in the safety movement, is a salutary balance between consistent progress and community security. So it becomes necessary for the engineer, the lawmaker, and the individual to coordinate their interests and efforts so that each may know and do what should be expected of him in the common interest."—***Willard Chevalier, Publisher of Business Week; Vice-President, McGraw-Hill Publishing Company.***

Quality, Size Requirements Given In Commercial Standard for Doors

Quality requirements and size standards for stock house, garage, and cupboard doors and sidelights made of old-growth Douglas fir are given in Commercial Standard CS 73-38, just released by the National Bureau of Standards. The standard became effective June 30, 1938. It was developed by the manufacturers of fir doors to establish definite classifications of quality for the guidance of the architect, builder, and home owner, and to fix the dimensions of the various types of doors to make it easier to obtain them readily from local dealers or jobbers.

In the absence of nationally recognized standards, architects have frequently specified doors for a home or building of a grade, type, or dimension not available from distributors' stocks, explains the announcement of the new standard by the National Bureau of Standards. This necessarily meant that the door had to be custom made, which required as many machine set-ups as there are parts to the door. All of the initial cost of laying out the job and of setting up the machines went into the charge for such special doors. In the mass production of doors of standard stock design, this same cost is divided among the hundreds or thousands of doors the detail features of which are standardized, thus considerably reducing the unit cost.

The Commercial Standard provides specifications for doors of four different thicknesses, and certain general requirements apply to the material to be used, workmanship, construction, sticking, inspection, and dimensional tolerances.

Under the detailed requirements there are 73 separate layouts with the necessary dimensions of stiles, rails, panels, etc. Most of these are classified into one or more grades, according to the natural or manufacturing defects which are present.

By referring to the standard and specifying the design number of the door desired, an architect may secure doors to meet his needs with ample competition, prompt deliveries and at a considerable saving in cost.

Copies of CS37-38 are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

Textile Merchants to Label Sheets and Pillowcases

Sheets and pillowcases below first-quality grade will be labeled to prevent any confusion with first-quality product, members of the Sheet and Pillowcase Group of the Association of Cotton Textile Merchants of New York agreed at a meeting March 15.

Inferior grades will be labeled with a choice of four terms: Irregulars, Second Quality, Second Selection, or Seconds. These terms are to be used in place of the descriptive expressions "run of the mill" and "run of the loom", which the group believes are unwarranted and misleading when applied solely to gradings inferior to first quality merchandise.

All producers, distributors, and dealers will be urged to cooperate wholeheartedly in this voluntary industry-wide action, which has already received the approval of the National Better Business Bureau, it was announced.

Sample Labels Shown In Labeling Handbook

A new *Handbook of Informative Labeling*, which contains an analysis of what information consumers want to find on labels as well as pages of illustrations showing what different organizations are already doing in the preparation of labels, has just been issued by Cruttenden and Eger, advertising agency of Chicago.

The booklet contains a section on "Why informative labeling?" which lists the organizations backing the consumer movement. It also includes an analysis of the type of information to be included on an informative label, a chart showing what type of information is wanted by consumers on labels for 25 commodity groups, a section on government regulations, and many samples of labels.

Copies can be obtained from Cruttenden & Eger, 64 East Lake Street, Chicago.

International Labour Office Compiles Safety Information on Elevators

THE dangers inherent in the use of elevators, and the methods which have been put into effect in various countries to assure their safe construction and operation, provide the theme for a new book just published by the International Labour Office at Geneva.

The book is one of a series of reports developed through the cooperation of the Correspondence Committee on Accident Prevention attached to the International Labour Office and is known as Bulletin No. 8 of the Second Section, Series F, on Safety. It is one of the most comprehensive discussions of safety in the construction and use of lifts (elevators) that has yet been prepared. The material included, however, is largely based upon European practices, and many of the illustrations may not present conditions with which American readers are familiar.

Part I of the report might be considered as a safety code for elevators, although it is not written in the code form generally used in the United States. It was prepared by the late Francesco Massarelli, former managing director of the Italian Industrial Accident Prevention Association, but was revised by the Correspondence Committee, and finally completed by the Safety Service of the International Labour Office after the death of Signor Massarelli.

It includes a discussion of different types of lifts; types of accidents caused by lifts; methods of protection by means of shaft enclosures, gates, doors, and interlocks; problems of safety connected with cages, balance weights, and guides; cage safety gear and speed governors; suspension ropes; arrangement of machine rooms; and lighting.

Part II shows what safety requirements for elevators are in effect in various countries throughout the world. Special reference is made in the Introduction to the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators, although the code itself is not reproduced because of its length. To indicate the type of regulations in use in the various states of the United States, the regulations of the State of Pennsylvania are given in part. Abstracts from the safety requirements for elevators in Australia, Finland, Germany, Great Britain, Italy, and the Union of South Africa, in addition to those from Pennsylvania, are included.

The report as a whole should prove to be an excellent reference piece for elevator manufacturers, users, inspectors, builders, and architects. It illustrates the fine technical material being produced through the Safety Section of the International Labour Office with the cooperation of its Correspondence Committee on Accident Prevention. This committee is composed of representatives from the various countries holding membership in the International Labour Office, the United States representatives being:

Swen Kjaer, U. S. Bureau of Labor Statistics
Colonel Henry A. Reninger, Lehigh Portland Cement Company
Cyril Ainsworth, American Standards Association

Among other subjects being considered by the International Labour Office are:

Safety in the building industry
Safety in the construction and use of ladders
Prevention of hand and foot accidents in foundries
Safe handling of corrosive liquids
Protection of heads and eyes
Abrasive wheels

Copies of *Safety in the Construction and Use of Lifts* may be ordered through the office of the American Standards Association at $1.50 each.

Supplement to Standard on Marking Gold Plate Articles

A supplement to the Commercial Standard on Marking of Gold Filled and Rolled Gold Plate Articles Other Than Watchcases, CS47-34, has been accepted and is effective from February 25, the National Bureau of Standards announces. The commercial standard was approved by the American Standards Association some five years ago.

The supplement, which authorizes the exemption of field pieces and bezels for lockets and includes a definition of these terms, is of such a minor nature that it may be considered as an editorial change, according to the statement by the National Bureau of Standards.

P. G. Agnew Speaks at Consumer Conference

P. G. Agnew, secretary of the American Standards Association, was one of the speakers at the first National Conference on Consumer Education at Stephens College, Columbia, Missouri, April 3-5. The conference was held under the auspices of the Institute for Consumer Education.

Comparison of Brick Tests Proves Effectiveness of ASTM Standard

Results show absorption test is accurate giving reproducible results; compressive strength test poor in comparison

A comparison of results of tests of building brick, carried out by two laboratories which used the same test methods, was reported by W. J. Krefeld of the Civil Engineering Research Laboratories of Columbia University and J. W. McBurney of the National Bureau of Standards in the January issue of the *Bulletin* of the American Society for Testing Materials. The comparison was made in order to check whether the standard tests for water absorption, transverse strength, and compressive strength were sufficiently explicit to give reproducible results when carried out independently by different laboratories.

Thirty whole bricks as nearly alike as could be judged by visual inspection were selected for the experiment. These bricks were numbered from 1 to 30, wrapped separately, and divided at random into two samples of 15 bricks each. Each of the cooperating laboratories received one of these samples and the following tests were made:

1. Water absorption was determined by 24-hour cold immersion and by five-hour boiling on the whole bricks after they had been dried.
2. The transverse strength was measured after redrying.
3. Water absorption by 24-hour cold immersion and by five-hour boiling was redetermined on both sets of half bricks resulting from the transverse test.
4. Compressive strength, flatwise, was determined on the dried half bricks constituting the first set and the second set of halves was exchanged with the cooperating laboratory.
5. Both laboratories determined water absorption by 24-hour cold immersion and by five-hour boiling on these exchanged halves, and then measured compressive strength on the same specimens after drying.

The only instructions were that both laboratories should use the standard Methods of Testing Brick (Modulus of Rupture, Compressive Strength, Absorption) C 67-37 of the American Society for Testing Materials. No consultation or correspondence took place between the laboratories concerning the methods until after completion of the tests. Each laboratory completed its tests and submitted its reports to a third party without knowledge of the results obtained by the other.

The conclusions reached after a statistical study of the test results showed:

1. The agreement between the two laboratories testing identical specimens was better than that obtained by either laboratory testing the two halves of the same brick. In other words, the accuracy of the absorption tests exceeded the reproducibility of the samples, unless the samples were identical.
2. The saturation coefficients (ratios of absorption by 24-hour cold absorption to absorption by five-hour boiling) differed by 0.002 for Sample 1 and by 0.000 for Sample 2 when identical specimens were tested by both laboratories.
3. The ASTM Standard C67-37 provides a water absorption test of satisfactory accuracy and reproducibility. That two laboratories, working independently and without previous comparison of methods, should check each other so closely on identical samples indicates that this standard provides sufficiently exact directions for procedure.
4. The accuracy and reproducibility of the compressive strength test is poor in comparison with the absorption test. Random errors of considerable magnitude are apparent and a systematic error caused by difference in strength of capping materials is possible.

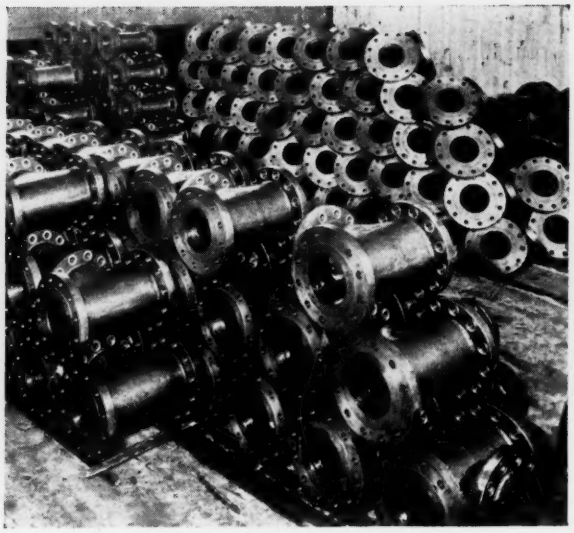
The results of this experiment will probably be used by the committee of the American Society for Testing Materials in charge of standard C 67-37 when it considers revising the standard.

British Company Tests Kitchen Equipment

An established standard of performance for kitchen utensils and apparatus is the object of a scheme just adopted by the Kitchen Planning Centre of London, according to an announcement in *Ironmonger*, London, December, 1938. The Planning Centre, which is sponsored by Lever Bros., Port Sunlight, Ltd., has set up a testing centre for all types of kitchen equipment. Manufacturers may send articles to be tested at this centre, and if the standards set up are reached the manufacturer is entitled to display on the article a label announcing the fact.

The main aim of the Centre is to improve the planning and convenience of the modern kitchen, says the article. At the premises in London there are fourteen model kitchens all suitable for various types of houses, containing what are considered to be the most efficient fittings, apparatus, and arrangements. Testing is done free of charge, and where a subject does not come up to the standards suggestions are made.

Revised



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